vations. The writer believes that a part of the trouble, at least, rests in the estimate of the wind force itself and its effects. The pans exposed in the free air are relatively much more freely exposed, even in light winds, than the pans floating low in a great sheet of water, especially when we bear in mind that the floating pans are extensively surrounded by a floating raft and breakwater system designed with the specific object of checking wind and wave influences. It seems likely, therefore, that the vapor sheet over the floating pans must really have been less disturbed by the wind, and had a greater density than in the case of the pans more freely exposed.

It is hardly worth while to speculate on the details of this problem, or of the several factors of the equation, until we get a sufficient number of exact observations giving us the unequivocal facts upon which we can build. The further evaluation of the terms of the equation herein proposed must, therefore, be deferred to a later paper. It seems necessary, however, to point out at this time, by way of conclusion, that a certain attention is necessary in selecting the proper values of e_a and e_d to use in forming the potential term.

Our judgment on this point must be guided by a careful consideration of the actual mechanics of evaporation which we must consider just briefly at this time.

Evaporation by pure diffusion takes place only in perfectly quiescent air, and we know the process is a very slow one. It is the kind of evaporation that takes place from a pan of water in a large closed room with no appreciable ventilation or convection. An evaporation equation, such as herein proposed, and that seems to meet open-air, windy conditions, must, in all probability, undergo important transformations to fit it to conditions of evaporation by pure diffusion. On the other hand, a pure diffusion equation is likely to be quite unsatisfactory, if applied to evaporation in the moving open air. Conditions favorable to pure diffusion probably never obtain in nature, or so rarely, and for such a short duration, that the amount of evaporation is inconsequential. We must observe, nevertheless, that in very sheltered locations, subject to very little wind, the evaporation may be controlled by the laws of pure diffusion to a very considerable extent, and these must, therefore, come in for a full share of recognition.

Nearly all ordinary evaporation in nature, however, is so dominated by the action of the wind, even when gentle, and by convection generally, that the mechanics of the phenomenon are very complex and very different from one of pure diffusion. Close down to the free water surface we must have a thin layer of air that is heavily charged with water vapor. The Reno observations of humidity one-half inch above the water surface show only a little more vapor than is in the air two or three feet higher. This indicates that the dense vapor sheet is very thin. We know, however, from our knowledge of viscosity and the flow of fluids that in spite of ordinary moderate wind action the thin gaseous sheet immediately next to the water is changed and renewed by the wind only with relative slowness. Vapor molecules that once pass beyond this thin, slow-changing sheet get caught up into the general circulation of the air we call the wind, and are carried away indefinitely.

In the absence of definite data to work upon it would seem that the potential term should be made up from measurement near to, rather than at some distance from the evaporating water surface. As already stated, however, the further solution of these important details must be deferred until some new data are available.

CHANGES IN THE MONTHLY WEATHER REVIEW.

In order that the readers of the MONTHLY WEATHER REVIEW may be prepared for the approaching changes in the scope and character of the Review we print the following order recently issued by the Chief of Bureau.

It appears from the following that those readers particularly interested in climatological statistics should request that the Review be continued to their address; those who are more interested in theoretical and technical discussions of data should request that the Mount Weather Bulletin be sent them in the place of the Review.

U. S. DEPARTMENT OF AGRICULTURE,
WEATHER BUREAU,
Washington, D. C., March 12, 1909.

Hereafter there will be combined in the MONTHLY WEATHER REVIEW all of the State Monthly Climatological Reports, except those from Porto Rico and Hawaii, which with Iowa, will continue as separate publications, but Iowa will also furnish to the Review the same data called for from other sections and it will be included in the Review. The Review will hereafter be a monthly report of the weather and climatology of the country, and there will be excluded from its pages everything technical that is not of a purely climatological nature or a current report of weather conditions.

It will contain no mathematical discussion or formulas. Such mathematical or other technical papers as receive the approval of the Chief of Bureau may be printed in the Mount Weather Bulletin.

The title page will not be changed. The cover will be the same color, but will be of the same weight of paper as that used in the Mount Weather Bulletin. The character of the material to be contained in the Review in generally indicated by exhibit "B," of which everything having a blue pencil mark will be eliminated.[1]

The Review will be printed under the direction of the Chief of Bureau, as indicated on the present title page. No other credit will be given on this page. Each article will be signed by its author, whose name may appear either at the beginning or at the end of the matter, and the Editor's and Assistant Editor's names may be printed on the second page as now.

The issue of the Review will be limited to 5,000. Each section director will be allowed enough copies to supply one copy to each cooperative observer and a few additional copies for distribution only to such as may make a profitable use of the publication. In this connection it must be carefully imprest upon section directors and others that this publication is an expensive one and its distribution must be rigidly limited. When the section directors and libraries and colleges are supplied, the remaining copies will be sent to such of the names on the present mailing list of the Weather Review as may be selected by the board composed of Mr. Williams, and Professors Abbe and Bigelow. Each section director should receive from 10 to 20 extra copies, depending upon the interests in his State to be served by such a report; the number will be determined by the Chief of the Climatological Division.

The report from each section will include the general table and daily precipitation, but the daily maximum and minimum table will be omitted. The Editor of the Review will prepare two charts, at least of the size of the daily weather map; on these charts he will enter such data from cooperative stations as is necessary in the publishing of a monthly temperature chart and a monthly precipitation chart, the temperature chart to include the arrows showing the prevailing direction of the wind. Special care will be exercised in the drawing of these charts so as to recognize the influence due to topography. Where no data is available, the charts will be drawn in accordance with the effect that mountains are known to have upon precipitation and temperature.

The Editors will prepare a complete discussion of the clima-

[1] These blue pencil marks, as put on the Monthly Weather Review for October, 1908, cut out the district reports on p. 326–7; everything on p. 327–345, except "Rivers and Floods," and "Weather of the Month;" the table on p. 356; also Chart IX.

tological features of the entire country for the month. Messrs. Abbe and Abbe, jr., will be the Editors.

Professor Abbe may have a short chapter each month under the caption of "Notes by the Editor," in which he will make a review of the progress of meteorological science or write about incidents thereto. An occasional article that deals with the climatology of the United States or of some portion of the world may also be included.

Each section director will report any items of special meteorological interest that may be observed in his section during the month, but all such data as giving the dates of the numerous thunderstorms and frosts and hails will be omitted unless they have a peculiar significance to the weather of the month. The Editor in writing his review of the month may refer to these if he thinks they are important.

The country will be subdivided into twelve natural climatic divisions that shall be consistent with the various watersheds, and the data will be grouped and published at this office in accordance with these new divisions.

The new publication will begin as soon as necessary arrangements can be effected. [Probably with the number for July, 1909.] * * *

Respectfully,

(Signed) WILLIS L. MOORE,
Chief U. S. Weather Bureau.

On April 1, 1909, "the Review Room and the work pertaining thereto" was transferred to the Climatological Division, and shortly afterward the following order was issued:

U. S. DEPARTMENT OF AGRICULTURE,
WEATHER BUREAU,
Washington, D. C., April 9, 1909.

Professors Abbe and Bigelow may each write reviews of, comments on, or criticisms of meteorological papers, researches or events, and publish them in the Review over his own signature. Mr. Abbe, jr., will, under the caption "Editor's Notes," and with appropriate subcaptions, briefly note the development and progress of meteorological science thruout the world, so that the Review may still mark, step by step, the development of the science without becoming a meteorological journal and without publishing extensively the details of meteorological papers.

Respectfully,

(Signed) WILLIS L. MOORE,
Chief U. S. Weather Bureau.

WEATHER WORDS IN ALL LANGUAGES.

The historical development of the study of meteorology has a very interesting side when we turn to the terms that are used by various nations. The comparison of these terms is not merely a study in comparative philology, but it throws light upon the poetical and philosophical ideas current among the respective nations. Moreover, as weather, storms, rain, and wind are common thruout the world, and every nation must have words for these simple elementary ideas, we should by means of the similarity of terms be able to infer something as to the intercourse of nations with each other, and the influence of one nation on others. A friend in New York has lately promised us a complete collection of meteorologic terms in use among the natives of various tribes that occupy nearly all the islands of the Pacific Ocean, and it is not impossible that this may throw light upon the methods by which those tribes have been dispersed thruout this aqueous half of the globe. Gov. John P. Finley, of Zamboanga, P. I. (who is also Major in the 28th Infantry, U. S. A., and was well known twenty years ago as an officer of the weather service actively interested in the study of tornadoes), has kindly furnished us with the following extensive list of names of certain meteorological terms used in the Philippines by English, Spanish, Maguindanao Moro, Sulu Moro, and Malay. The Maguindanao Moro terms are given in both English and Arabic characters, which latter we omit. We understand that the Arabic characters are used quite extensively in the Philippines, and it seems to us not unlikely that traces of old Arab terms may still survive in the extreme East. We have often stated that the term *euroclydon* which appears in Acts, Chapter XXVII, verse 14, as a Greek word, is simply a transliteration to suit the Greek taste for euphony of the Phoenician or Hebrew words *eulos krudon*, a strong wind, which itself must have been closely allied to some Arabic term. As the Phoenicians were great sailors and the Arabs equally extensive traders and travelers, we may not unreasonably expect to find other Phoenician and Arabic words transmuted into modern popular usage. To those who take an interest in philology and etymology we commend the history of words relating to the weather as a subject that is likely to throw light upon the earliest phases in the history and migrations of nations.—*C. A.*

Meteorological terms used in the Philippines, compiled by Maj. J. P. Finley.

English.	Maguindanao (Moro).	Sulu (Moro).	Spanish.	Malay.
White clouds	Gabun a maputi	Andum puti	Nubes blancas	awan puti.
Dark clouds	Gabun a maytum or (Rundung)	Gabun	Nubes obscuras	awan itam
High clouds	Gabun a mapu'u	Awan mata'as	Nubes elevadas	awan tinggi.
Low clouds	Gabun a mababa	Awan hababa'	Nubes bajas	awan randah or rendah.
Clouds	Gabun	Awan	Nubes	Awan.
Fog	Lukup	Gabun	Niebla	Kabut.
Rain	Uran	Ulan	Lluvia	Hujan.
Heat	Kayaw	Pasu	Calor	Panas.
Cold	Katinggaw	Haggut	Frio	Sejuk.
Rainbow	Bulutu or Tupung.	Inak	Arco iris	Plangi.
Storm	Rilut or Subusubu.	Humus or Unbak tawpan.	Tormenta	Rilut.
Thunder	Ruggung	Dawug-dug or Dang-dug.	Trueno	Guroh.
Lightning	Kilat	Kilat	Relampago	Kilat.
Wind	Undu'	Hangin	Viento	Angin.
Snow or hail	Uran-watu	Ulan batu	Nieve ó granizo	Thalj (Ar.).
Ice	Ig-a-watu	Tubig-batu	Hielo	Ayar baku.
Moisture	Maglasa or Musa	Basa'	Humedad	Lengas.
Current	Margus Ig	Sug	Corriente	Arus.
Kite	Layang-layang	Taguri	Cometa	Layang-layang.
Waterspout	Subu-subu	Bubawi	Manga mariua	Puting bliou.
Whirlwind	Ripurus	Ayimpus or Aimpus.	Remolino	Angin puting bliong.
Sunlight	Sigay	Sawa	Luz del Sol	Trang.
Darkness	Kalibutung	Lindom	Oscuridad	Glap.
Moon	Ulan-ulan	Bulan	Luna	Bulan.
Sun	Snang	Suga	Sol	Mata hari.
Star	Bitun	Bit'un	Estrella	Bintang.
Weather (day)	Gay	Adlaw	Tiempo	Musim.

WINTER ARIDITY INDOORS.

By Prof. M. S. W. JEFFERSON, Ypsilanti, Mich.

[Reprinted from Journal of Geography, Vol. I, No. 10, December, 1902.]

The very interesting paper by Professor Ward in the September Journal of Geography[1] suggests arithmetical treatment to show the actual quantities of water demanded in connection with a heating and ventilating plant to preserve a healthful humidity within doors in winter.

On the average of the twenty-one days of Professor Ward's observations an outside temperature of 36° F. was accompanied by a relative humidity of 71 per cent. There were present then in each cubic foot of air 1.77 grains of water vapor. This was warmed within the house to a temperature of 69° and then showed a relative humidity of 30 per cent. Corresponding to these figures is a water vapor content of 2.32 grains per cubic foot, showing an increase in the absolute amount of water present of 0.55 grain per cubic foot, which must be credited to the water pans used in connection with the heating apparatus.

To obtain what we might call a healthful humidity, of say 70 per cent at 70° F., 5.59 grains of water are needed to the cubic foot. There was a deficit of water vapor then in the room examined to the amount of 3.82 grains per cubic foot.

[1] See Monthly Weather Review, September, 1908, 36:281.